REMARKS

In the Office Action mailed March 16, 2006,

Claims 11, 48, 49, 50 and 58 were indicated to be allowable.

Claim 57, 64 and 65 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement, and were further rejected under 35 U.S.C. 103(a) as unpatentable over Frazier et al. in view of Pisano et al. and Lin et al and Say et al.

Claims 1-8, 12, 25-27, 31, 34, 36-37, 50, 60, 67, 68 and 70 were rejected under 35 U.S.C. 103(a) as being unpatentable over Frazier et al.(WO 01/93930) in view of Pisano et al. (US 5,928,207). It is respectfully submitted that claim 50 has been included in this rejection by typographical error because claim 50 has been indicated to be allowable.

Claims 9, 13-15, 18,19 and 20-24 were rejected under 35 U.S.C. 103(a) as unpatentable over Frazier et al. in view of Pisano et al., as applied to claims 1-8, 10, 12, 25-27, 31, 34, 36-37 and 60 above, further in view of Say et al.(US 6,134,461).

Claims 1-10, 12-15, 18.19, 20-27, 31, 34, 36-37, 50, 60, and 67-70 were rejected under 35 U.S.C. 103(a) as being unpatentable over Frazier et al.(WO 01/93930) in view of Pisano et al. (US 5,928,207). It is respectfully submitted that claim 50 has been included in this rejection by typographical error because claim 50 has been indicated to be allowable.

Claims 16 and 17 were rejected under 35 U.S.C. 103(a) as unpatentable over Frazier et al. in view of Pisano et al. and Say et al, as applied to claims 9,13-15, 18, 19 and 21-24 above, further in view of Meade et al. (US 5,770,369)

Claim 20 was rejected under 35 U.S.C. 103(a) as unpatentable over Frazier et al. in view of Pisano et al. and Say et al., as applied to claims 9,13-15, 18, 19 and 21-24, further in view of Lin et al.

CLAIM AMENDMENTS, ADDITIONS AND CANCELLATIONS

Claims 68-70 have been canceled without prejudice. Claim 71 was not entered in the Non-Compliant Amendment dated September 18, 2006, and is canceled in this corrected amendment.

Claims 1, 29, 57, 64, 65 and 67 have been amended. Applicants submit that no new matter has been entered with these amendments.

Claims 1 and 67 have been amended to recite that applicants' biosensor microprobe device does not have a closed fluid channel in any portion of the device that passes into the subject during penetration to access the fluid.

Withdrawn claim 29 has been amended to recite that the open fluid channel is formed in the substrate, in that fluid channel from the penetration end to the biosensor passes through both the microprobe portion and the body portion when the biosensor is on the body portion, as is illustrated in Figure 2A.

Claims 57, 64 and 65 have been amended to recite that any part of the microprobe that ppasses into the body during penetration to access the fluids has a uniform thickness that is less than the thickness of the body. The applicants submit that the term "uniform thickness" allows for some acceptable degree of unintended variation from perfect uniformity, e.g., due to limitations of the process used to fabricate the microprobe portion. Further, at the interface between the body portion and the body end of the microprobe portion, variations in thickness occur as a result of the fabrication technique.

CLAIM REJECTIONS

Claims 68-70

Claims 68-70 have been cancelled without prejudice. The applicants submit that the rejections of claims 68-70 are moot in view of the cancellation of these claims.

Claims 1-8, 10, 12, 25-27, 31, 34, 36-37, 50, 60, 67, 68, and 70

Claims 1-8, 10, 12, 25-27, 31, 34, 36-37, 50, 60, 67, 68, and 70 were rejected under 35 U.S.C. 103(a) as unpatentable over Frazier et al.(WO 01/93930) in view of Pisano et al. (US 5,928,207). Claims 1 and 67 have been amended to recite that applicants' biosensor microprobe device does not have a closed fluid channel in any portion of the device that passes into the subject during penetration to access the fluid. In operation, the hollow microneedle of Frazier et al. is inserted through the skin, causing the distal end of the closed fluid channel to penetrate into the subject. A biosensor is deposited on at least one wall of the closed channel and analyte-containing bodily fluid drawn over the sensor. For fluid withdrawal or delivery, the closed channel must penetrate into the subject to permit transport of the fluid through the channel.

Claims 1-10, 12-15, 18-27, 31, 34, 36-37, 50, 60 and 67-70

Claims 1-10, 12-15, 18-27, 31, 34, 36-37, 50, 60 and 67-70 were rejected under 35 U.S.C. 103(a) as unpatentable over Frazier et al.(WO 01/93930) in view of Pisano et al. (US 5,928,207), and further in view of Say et al. (US 6,134,461).

Frazier et al. teach the virtues of their closed channel hollow microneedle device for fluid injection and extraction. The device can also monitor analyte concentrations of both injected and extracted fluids. Applicants submit that removal of the closed channel would destroy device use for fluid injection, or for fluid extraction using the variety of pumping and transducer mechanisms taught (page 6, lines 29-32, page 7 lines 1-13). Similarly, monitoring of analyte concentrations in these fluids would not be possible. There is therefore no motivation in Frazier et al. to remove the closed channel from their device.

Frazier et al. further teach the advantages of a bioluminescence-based biosensor, which provides substantial sensitivity and accuracy over a wide concentration range (Frazier et al. page 18, lines 12-15). Frazier et al. teach that this type of biosensor, which emits light rather than producing an electric signal, can be deposited on one or more inner walls of the closed channel

of a hollow microneedle (Frazier et al. page 18) in order to sense analyte presence in fluid drawn into the channel. Frazier et al. also teach the use of the closed channel itself to transfer the emitted light to an optical detector. Generally, detection of the emitted light is performed at the output ports of the microneedle (Frazier et al. page 18, lines 11-12). The optical detector may be inside microneedle or may detect the light through a window in the wall (Frazier et al. page 19, lines 21-25). Furthermore, Frazier et al. teach the use of a light enhancing reflective coating on the inside surfaces of the closed channel to enhance the light output generated during a bioluminescent reaction, providing greater detection sensitivity (page 15, lines 30-34).

Say discloses a structure where the sensor is located at the penetration end of the device, and is connected to the body portion via wires. There is no closed channel in Say's device. Applying the configuration of Say to Frazier, the bioluminescent-based biosensor would be located on the probe substrate at the penetration end. During use, the probe would penetrate into the subject and access the analyte-containing bodily fluid. Without a closed channel, essentially all the light emitted by the biosensor would be lost into the body of the subject and not reach the optical detector even if the latter (e.g. a photodiode) were also located on the penetration end of the substrate, close to the biosensor.

Since Frazier teaches the virtues of a closed fluid channel as both a waveguide a means of enhancing light emission one of skill in the art would not be motivated to remove the closed channel as taught by Say. Furthermore, removing the closed fluid channel would destroy the function of the device taught by Frazier since there would be no way for the light to reach the sensor. Thus there would be no technological motivation for combining Frazier with Say. As such these two references are not properly combinable and a prima facie case of obviousness cannot properly be made regarding the applicant's invention. See in re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Therefore, the applicant submits that claim 1, as it now stands, fully satisfies the requirements of 35 U.S.C. § 103 and is patentable thereunder.

Say et al. further teach that the probe substrate is a non-conductive (therefore high resistivity) material. Nowhere do Say et al. disclose or suggest that the substrate should be single-crystal silicon as claimed by applicants. Single-crystal silicon is a semiconductor, a poorer insulator than the substrates taught by Say. Say et al. teach that the sensor is formed directly on the surface of a "variety of non-conducting materials, including, for example, polymeric or plastic materials and ceramic materials." Col. 7, lines 52-54. The ceramic materials

include aluminum oxide and silicon dioxide. Col. 8, lines 14-15. Applicants submit that use of single crystal silicon in the device of Say as taught by Pisano would destroy the function of the invention of Say, which requires a non-conducting substrate. As such there would be no motivation to combine Say with Pisano and a prima facie case of obviousness is not present (see *in re Gordon).*

Furthermore, claims 2, 5-10, 12, 26-27, 31, 34 and 37 depend from claim 1 and recite additional features therefor, claims 3-4 depend from claim 2, claims 13, 25 depend from claim12, claims 14, 16, 18 depend from claim13, claim 15 depends from claim14,claim 17 depends from claim16, claims 19-24 depend from claim18, claim 36 depends from claim 34, and claim 60 depends from claim 5. As such, and for the same reasons set forth above, the applicants submit that these dependent claims define an invention suitable for patent protection.

Claims 57, 64, and 65

Claims 57, 64, and 65 were rejected under 35 US.C 112, first paragraph. These claims have been amended to require a uniform thickness over any part of the microprobe portion that passes into the body during penetration to access the bodily fluid, this thickness being less than the thickness of the body portion. Applicants submit that these claims now contain no new matter. Claims 57, 64, and 65 were further rejected under 35 U.S.C. 103(a) as unpatentable over Frazier et al. in view of Pisano et al. and Lin et al. and Say et. al. As the Office Action states, the Frazier/Pisano combination does not teach the relative thicknesses of the needle and body.

Lin et al. teach a device with a uniform 50 micrometer thickness over the entire body (shank end 12, FIG. 2B) (column 7, lines 40-4) and along an adjacent section of the microprobe portion (shaft 14, FIG. 2A) (column 4, lines 22-24). The tip end of the shaft is then etched, tapering irregularly on the sides and bottom to form a small, sharp terminal point. Claims 57, 64, and 65, as currently amended, teach that any part of the microprobe portion of applicants' device that passes into the subject during penetration to access the fluids (equivalent to the shaft and tip region in Lin et al.) has a uniform thickness that is less than the thickness of the body (shank). This thinning of the microprobe portion minimizes pain upon penetration into the arm. Lin et al.'s microneedle, by contrast, is designed to penetrate brain tissue, which does not experience pain. Lin et al. teach that a thicker shaft provides strength (column 9, lines 36-38 and 57-59), thus teaching the benefit of maintaining the shank thickness in the shaft portion, and also teach

that a small terminal point is required to fit between adjacent neural cells (column 10, line 1). Accordingly, Lin et al. do not teach or suggest that any part of the microprobe portion that passes into the subject during penetration have a uniform thickness, as do claims 57, 64, or 65 as amended, and there is no motivation for Lin et al. to do so.

Say et al. teach a device of uniform thickness with a point formed in the X-Y plane. Nowhere do Say et al. teach or suggest that that the part of the microprobe portion that passes into the subject during penetration to access the fluids should have a uniform thickness that is less than the thickness of the body. Applicants submit that a prima facie case of obviousness has not been established because even in combination Frazier et al, Pisano et al., Lin et al. and Say et al. fail to disclose all the features recited in claim 57, 64 and 65 as amended.

The applicants submit that the rejections of:

claims 9, 13-15, 18 and 20-24 over Frazier et al. in view Pisano et al., as applied to claims 1-8,10,12, 25-27,31,34,36-37, 50 and 60 further in view of Say et al.,

claims 16 and 17 over Frazier et al. in view of Pisano et al. and Say et al, as applied above, further in view of Meade et al., and

the rejection of claim 20 over Frazier et al. in view of Pisano et al. and Say et al, and further view of Lin et al.,

are overcome by virtue of their dependence on claims that are believed to be allowable for the reasons discussed above.

Declaration under 37 C.F.R. §1.131 regarding 35 U.S.C. §103(a) Rejections

Claims 1-10, 12-27, 31, 34, 36-37, 57, 60, 64-65 and 67-70 were rejected under 35 U.S.C. 103(a) as being obvious over International Patent Publication WO 01/93930 A1 to Frazier et al ("Frazier") in view of other art. The arguments made in the response above are believed to have been fully satisfactory in overcoming these rejections. Nevertheless, in the interest of advancing prosecution, a Declaration has been submitted pursuant to 37 C.F.R. §1.131 by one of the inventors, Wilson Smart. The Declaration establishes that the subject matter of the present application was invented prior to the filing date of Frazier. Frazier was filed on June 1, 2001, less than ten months before the filing date of the present application. Frazier claims priority to U.S. provisional application 60/208,868, which was filed on June 2, 2000. One of the inventors, Wilson Smart, states that Exhibits 1 and 2 were developed prior to June 2, 2000, the earliest possible priority date for the subject matter in Frazier. Additionally, one of the inventors, Wilson

Smart, states that he diligently worked on the technology disclosed in the patent application from its conception until at least June 1, 2001. Hence, it is clear that the subject matter disclosed and claimed in the present application was invented before June 2, 2000. Therefore, the Applicants respectfully request that the 35 U.S.C. § 103(a) rejections based on Frazier be withdrawn.

Information Disclosure Statement

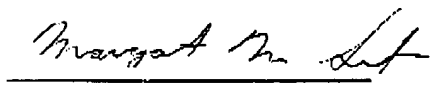
A supplemental information disclosure statement (IDS) was included with the amendment filed September 18 to correct the date of a reference included in the previous IDS submitted December 21, 2005 and to add a new reference of which applicants had not been aware. It is respectfully submitted that initialed copies of both these IDS be returned with the next communication from the Patent Office

CONCLUSION

In view of the foregoing, applicants believe that all of the claims are now in condition for allowance. The applicants therefore respectfully request reconsideration of the application and a notice of allowance. If for any reason the Examiner believes any of the claims are not in condition for allowance, he is encouraged to phone Joshua D. Isenberg (Reg. No. 41,088) at (510) 668-0965 so that any remaining issues may be resolved.

Respectfully submitted,

Date: October 29, 2006



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